

Maritime Unmanned Systems (MUS)

Declaration of Intent ¹ signed	Memorandum of Understanding ² signed	Delivery of capabilities
	Delivery of enabling activities	

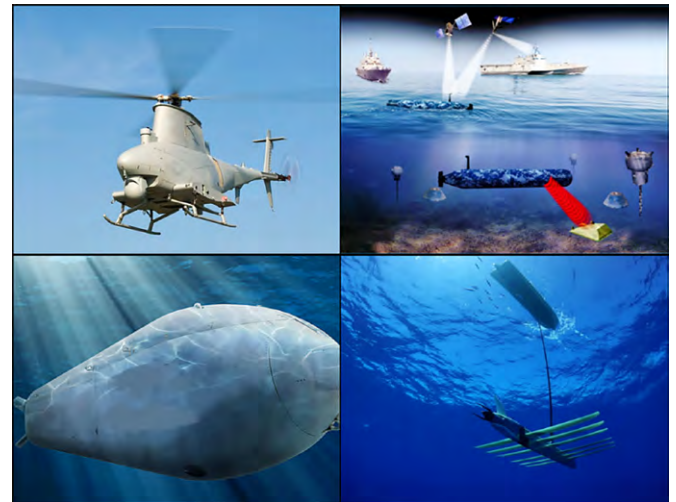
Participants



What is MUS?

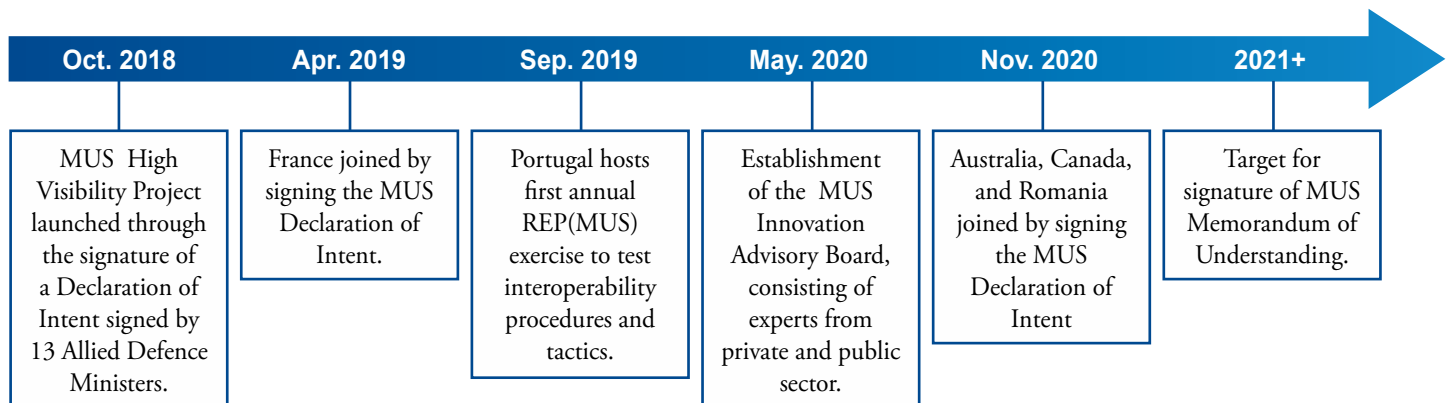
The Maritime Unmanned Systems (MUS) initiative allows nations to pool their resources, talent and ingenuity to create better, more flexible and more interoperable unmanned maritime vehicles and systems. MUS supports the transition from large and expensive fleet platforms to fleets of autonomous systems supporting and working together with manned assets which can make navies more versatile and capable.

To the right is an overview of existing and envisioned maritime autonomous vehicles, in clockwise order: Northrop Grumman MQ-8 Fire Scout (Unmanned Helicopter); illustration of manned and unmanned systems working together; Boeing Echo Voyager (Unmanned Submarine); Boeing Wave Glider (maritime observation vehicle)



Multinational effort

At the Brussels Summit in 2018, NATO leaders reaffirmed the strategic importance of the maritime domain and the importance of investing in new unmanned capabilities. The MUS multinational High Visibility Project³ was subsequently launched by 13 Allied Defence Ministers in October 2018. In April 2019, during the bi-annual Conference of National Armament Directors, France became the 14th participant. In November 2020, the initiative welcomed 3 new participants--Australia, Canada, and Romania—highlighting the global reach of MUS. The first deliverable of the MUS initiative was the first annual edition of operational exercise Recognized Environmental Picture, Maritime Unmanned Systems (REP(MUS)19), hosted by Portugal and featuring dozens of unmanned underwater, surface and air vehicles. It focused on integrating unmanned systems in naval operations.



1 Initial non-binding document outlining participants' will to explore the area in question further.
 2 Legally binding document specifying details of cooperation.
 3 Multinational initiative tailored to address key capability areas, usually launched on the Defence Ministers' level.

Why is it important?

NATO Allies are working together to develop and procure innovative maritime solutions and applications to increase operational effectiveness, limit risk to human life and reduce operational costs. The use of unmanned systems is a game changer in maritime technology. They will deliver benefits across a broad range of missions, such as the detection and clearing of mines, the monitoring and protection of sea lines of communication and underwater cables, maritime situational awareness, and finding and tracking submarines. They will also reduce costs.

Unmanned systems can help overcome the constraints faced by traditional, crew-dependent maritime platforms, such as ships or submarines, in terms of the areas they can cover, direct and indirect costs, and personnel. Mine clearing operations, for example, pose risks to the health and safety of crew members. Autonomous systems can take over this task, while crew members watch from a safe distance. Working alongside traditional naval assets, unmanned systems can also improve situational awareness, which is critical in ensuring free access to the seas.

How does it work?

The MUS multinational High Visibility Project helps introduce unmanned capabilities into Allies' navies. Its programme of work consists of a growing number of individual activities organized around seven main areas of cooperation:

1. **Information Sharing:** working on a MUS database to identify potential areas for multinational cooperation and connect similar activities, standards and digital architecture.
2. **Policy:** integrating MUS into NATO strategies to ensure proper operational use.
3. **Standardisation:** standardising technical details and characteristics to enable, for example, the launch of an Italian maritime unmanned system from a German frigate to provide collected data to a US aircraft, before ending its mission on a French destroyer.
4. **Doctrine Development:** specifying the rules and regulations for the use of maritime unmanned systems.
5. **Research & Operational Experimentation:** finding new technical solutions or ways to use existing unmanned systems through the annual REP(MUS) exercise, hosted by Portugal.
6. **Logistics, Support and Training:** including MUS in NATO or national exercises beyond REP(MUS), developing a set of lessons learned from exercises, and exploring the use of common NATO MUS training, maintenance and logistics.
7. **Acquisition and Industry Engagement:** exploring design prototyping and procurement of industry solutions, such as an anti-submarine barrier technology for harbour protection, and establishing a dialogue with industry to maintain NATO's technological edge.

Did you know?

1. Beyond the maritime domain, NATO Allies have introduced unmanned capabilities in the air domain, such as the remotely piloted aircraft of NATO's Alliance Ground Surveillance (AGS) Force.
2. A hallmark of the MUS initiative is its ambition toward innovation and speed. This is why the Innovation Advisory Board, created in May 2020, brings together people from diverse backgrounds, areas of expertise and experience in the public and private sectors, including a marketing executive from Coca-Cola and a former foreign minister.
3. The REP(MUS) exercise is the largest military exercise solely dedicated to the exploration and testing of maritime unmanned systems in the world.

